CHAPTER 1.0 PURPOSE AND NEED

This chapter presents the purpose of the project and the need for transportation improvements along the Interstate-15 (I-15) corridor in Utah County and south Salt Lake County. It was prepared in accordance with the United States Department of Transportation Federal Highway Administration (FHWA environmental regulations contained in 23 CRF Part 771 *Environmental Impact and Related Procedures* and Technical Advisory 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents).* This Environmental Impact Statement (EIS) for the I-15 Corridor has been prepared according to the provisions of the National Environmental Policy Act (NEPA) and the corresponding regulations and guidelines of the Federal Highway Administration (FHWA), the lead federal agency.

This document also conforms to the requirements of the Utah Department of Transportation (UDOT), the project sponsor and lead state agency. In addition, the Utah Transit Authority (UTA) has been a co-project sponsor.

Lead Agencies and Project Sponsors. FHWA and UDOT have joint responsibility for developing highway infrastructure in Utah. These agencies are working together to make the highway-related decisions for the I-15 Corridor based on the EIS process. Similarly, the Federal Transit Administration (FTA) and UTA share the responsibility for transit. FHWA, UDOT, and UTA (as a co-project sponsor) have been working together throughout the EIS process.

Metropolitan Planning Organizations. The Mountainland Association of Governments (MAG) and Wasatch Front Regional Council (WFRC) are designated metropolitan planning organizations that work in partnership with UDOT, UTA, and other stakeholders to develop regional transportation plans for the communities in their jurisdictions. MAG's area of responsibility includes the communities in Utah, Summit, and Wasatch counties. WFRC's area of responsibility includes Davis, Morgan, Salt Lake, Tooele, and Weber counties. As the regional metropolitan planning organizations, MAG and WFRC provide input into the decision process for highways and transit in Utah and Salt Lake counties, respectively.

Cooperating Agencies. Cooperating agencies involved with the preparation of this EIS include the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers. These agencies have been participating in the development of relevant technical studies and methodologies and have been identifying the EIS content necessary to meet NEPA requirements and other requirements regarding jurisdictional approvals, permits, licenses, and clearances.

1.1 Introduction

The NEPA process for the "I-15 Corridor Utah County to Salt Lake County Project" began in 2004. At that time it was envisioned that the environmental impact statement (EIS) being prepared for the project would serve as the decision document for both the major highway component and the major transit component of a contemplated multimodal solution to the existing and projected mobility issues in the corridor. Based on regional and local planning documents, including the applicable regional transportation plans, the primary components being considered to improve mobility in the corridor included both a significant rebuild of I-15 and the implementation of a major new transit element (e.g., commuter rail, light rail or bus rapid transit). It was also thought that both the highway and transit components would require federal funding or other major federal approvals and therefore would both be subject to NEPA. Accordingly, a decision was made to prepare a single EIS with involvement of both the highway agencies (FHWA and UDOT) and the transit agencies (FTA and UTA), which would form the basis for a decision on both highway and transit improvements in the corridor.

Based on this approach, the agencies proceeded with the scoping process and with the development and screening of NEPA alternatives, and by fall 2005, had narrowed the alternatives that would be carried forward for detailed NEPA analysis to the No Build Alternative, and to four build alternatives. The primary components of one build

alternative (Alternative 4) was the widening and reconstruction of I-15 and the construction and operation of commuter rail in the I-15 corridor, from Provo to Salt Lake City.

Then, in November 2006, voters in Utah and Salt Lake counties approved a measure that resulted in complete local funding for construction by UTA of a commuter rail line in Utah and Salt Lake counties, which enabled commuter rail to move forward as a separate locally funded project. This was essentially the same project that was the transit component of the build alternative that was then being analyzed by the agencies for the I-15 Corridor EIS. In April 2007, FHWA, UDOT and UTA agreed that because the commuter rail project was locally funded and no federal funding or major federal approvals were required, and because construction was slated to begin in Spring 2008, it was no longer necessary for commuter rail to be considered as a part of a proposed action or build alternative in the I-15 Corridor EIS. Instead, UTA studied commuter rail in an environmental disclosure document prepared pursuant to UTA policy, which was completed in October 2007.[1]

In light of these events, FHWA and UDOT reviewed the purpose and need, and the assembly and screening of alternatives that had already been prepared for use in the I-15 Corridor EIS, and determined that the screening process and resulting alternatives remained valid and appropriate. The only required change in the alternatives was removal of commuter rail as a component of Alternative 4. Instead of being considered in Alternative 4, commuter rail was effectively made part of the No Build Alternative, which includes all existing, approved and planned transportation improvement projects to the year 2030. This left I-15 widening and reconstruction, with potential alternative configurations at several points along the corridor, as the primary component of Alternative 4 that was carried forward for detailed study in this EIS.

To ensure there is full disclosure and a context for the alternatives that are considered in this EIS, chapters 1 and 2 include appropriate discussion of those considerations that were primarily related to the transit component of the I-15 Corridor mobility improvements. The transit component is satisfied by the approval and imminent construction of commuter rail as a locally funded UTA project.

Since the publication of the DEIS, the document has undergone a number of changes, listed below:

- A Preferred Alternative has been selected (Section 2.6), and Chapters 3 and 4 have been edited to reflect that selection.
- The traffic model has been updated, necessitating changes to traffic descriptions in Chapters 1 and 2, as well as the assessment of impacts to Noise (Section 3.7) and Air Quality (Section 3.8).
- Two historic properties have been re-evaluated, and Section 3.16 and Chapter 4 have been updated accordingly.
- Updates to the project's on-going consultation and agency coordination are presented in Chapter 5.
- Comments received during the public comment period are presented with responses in Appendix D.
- Commitments to mitigate environmental impacts are in Appendix E.
- Design refinements have been made to the Preferred Alternative to further reduce environmental impacts. These are described in Section 2.2.

[1] Provo to Salt Lake City FrontRunner Final Environmental Study Report, October 2007.

1.2 Study area

The study area considered in this EIS is shown on Figure 1-1. From south to north, it extends from the South Payson interchange (Exit 248) in Utah County to the 12300 South Interchange (Exit 291) in Salt Lake County. The limits of the study area were developed based on the projected travel demand and on the limits of other studies and transportation improvement projects. South of the study area, congestion is not projected to exceed acceptable standards in 2030. North of the study area, travel demand is addressed by other discrete projects that have already been approved or are in a separate planning process.

1.3 Need for the Project

Several transportation-related needs were identified along the I-15 corridor in Utah and Salt Lake counties. These needs are summarized here and addressed in Sections 1.9 – 1.12.

First, there is a need to avoid the unacceptable level of congestion which is projected to occur due to increased travel demand in the I-15 corridor. Based on projected growth in population and vehicle miles traveled, it is expected that by 2030, 15 of 21 mainline I-15 segments will be LOS E or F (as shown in Figure 1-2). In general, a LOS lower than D is considered unacceptable. Additionally, peak hour congestion will also exceed acceptable levels at one or more of the interchange components (i.e., ramps, intersections[2] or surface streets) at 18 of the 22 interchanges on I-15 along the study corridor (as shown in Figures 1-3 to 1-6). Within the 22 interchanges, 40 of 61 components will have an unacceptable level of service. These 2030 projections assume that all other highway and transit projects in applicable regional transportation plans, including commuter rail and the Mountain View Corridor project, have been implemented. This need for transportation improvements in the I-15 corridor is recognized by regional and local transportation and land-use plans (see Section 1.5, Previous Studies and Regional Plans). These include the regional transportation plans maintained by the Wasatch Front Regional Council (WFRC) and Mountainland Association of Governments (MAG), which under federal law are responsible for transportation planning in the project area.

There is also a need to address substandard I-15 roadway features, which contribute to both congestion and safety concerns. Analysis of the existing I-15 roadway indicates that there are 15 vertical curves and 2 horizontal curves that are substandard due to inadequate stopping sight distance; two ramps which have inadequate acceleration length; and 13 bridges which require replacement or significant repair. Crash analysis of I-15 indicates that for 11 out of the 14 crash analysis segments in the project area, the crash severity rate exceeds the statewide average for similar roadways. These data are discussed later in this chapter.

The primary need for the Project – avoiding unacceptable congestion on I-15 – will be partially achieved by the commuter rail project that was previously being considered in this NEPA document but now is proceeding independently as a locally funded UTA project. However, as indicated by the above-projected congestion levels on I-15, there is still a substantial need to be addressed by this project.

1.4 Purpose of Project

This project has a primary purpose and several secondary purposes. The primary purpose is to relieve 2030 peak-hour congestion within the I-15 corridor to acceptable levels, on mainline I-15, on the existing 22 interchanges, and interchange components which provide access to and from local communities.

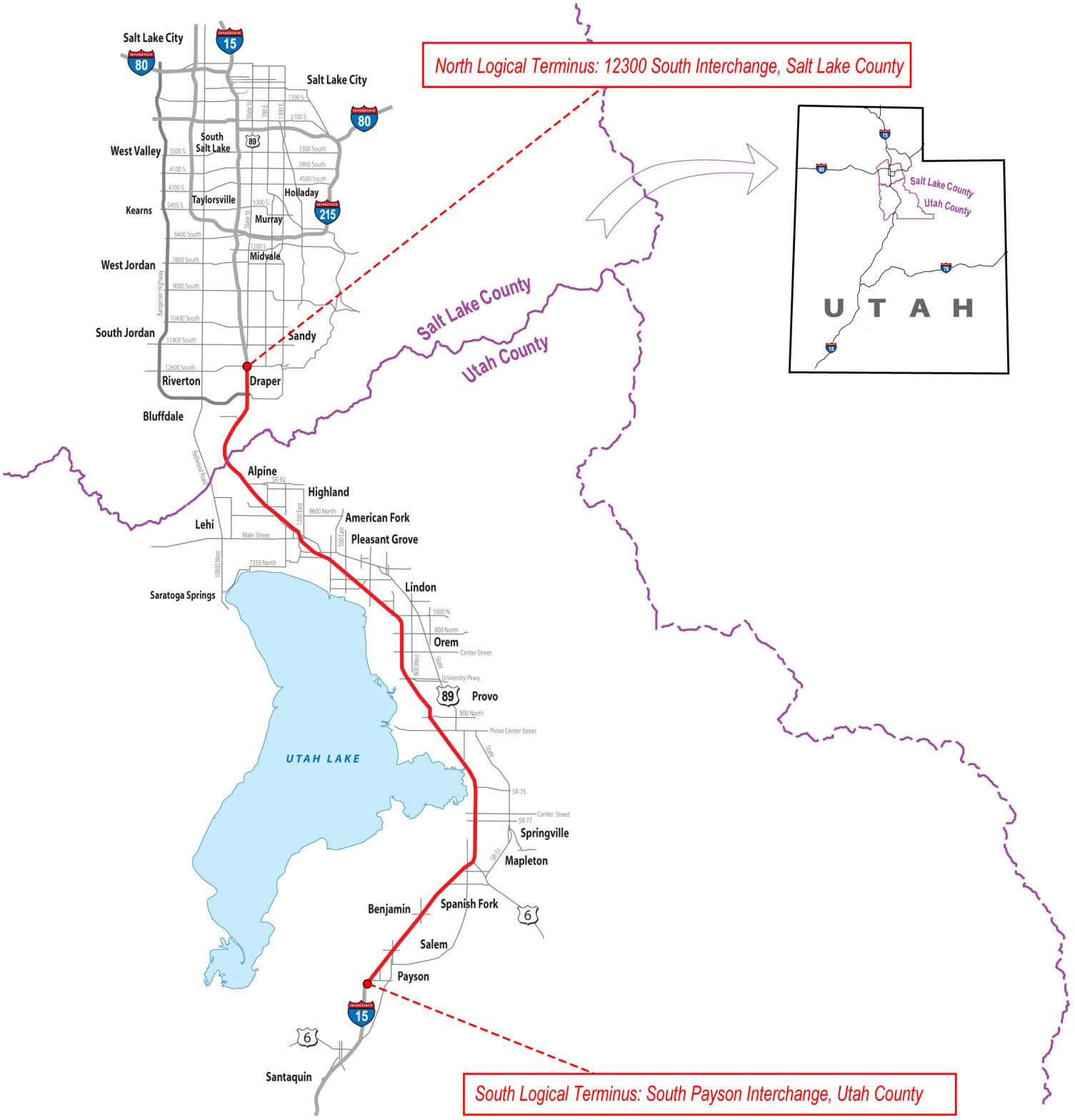
[2] Intersections refer to ramp intersections as well as the first arterial intersection adjacent to the ramp termini, as appropriate.

The secondary purposes or objectives of this project include:

- Achieving Level-of-Service (LOS) D on I-15, interchanges and their components for the year 2030;
- Improving roadway safety by upgrading substandard roadway, bridge, and interchange elements to current American Association of State Highway Transportation Officials (AASHTO) and UDOT design standards;
- Providing consistency with regional transportation plans prepared by MAG and WFRC;
- Improving the regional and intra-county movement of people and goods;
- Providing a transportation system that is reasonably consistent with locally adopted land use and transportation plans and with the stated objectives of local governments and communities.

As described in Chapter 2, the primary purpose and need (relieving projected 2030 peak-hour congestion on I-15) was used to screen out alternatives, while the secondary purposes and objectives were used to refine and compare alternatives but were not used to screen alternatives from further consideration.

Additional purposes that were considered during the initial screening process, before commuter rail was locally funded and approved as the primary transit element in the I-15 corridor, included providing cost-effective transit services (taking into account capital, operating, and maintenance costs and the incremental annual costs per rider) and substantially increasing the daily transit trips in Utah County and between Utah County and Salt Lake County. These purposes, which were the primary basis for inclusion of the commuter rail in the build alternative as initially formulated, are being served by the commuter rail project that is now proceeding as a separate local UTA project.



Scale in Miles
0 1 2 3 4 5

Figure 1-1
I-15 Corridor Study Area Map

N

2005 Existing Level of Service

2030 No Build Level of Service

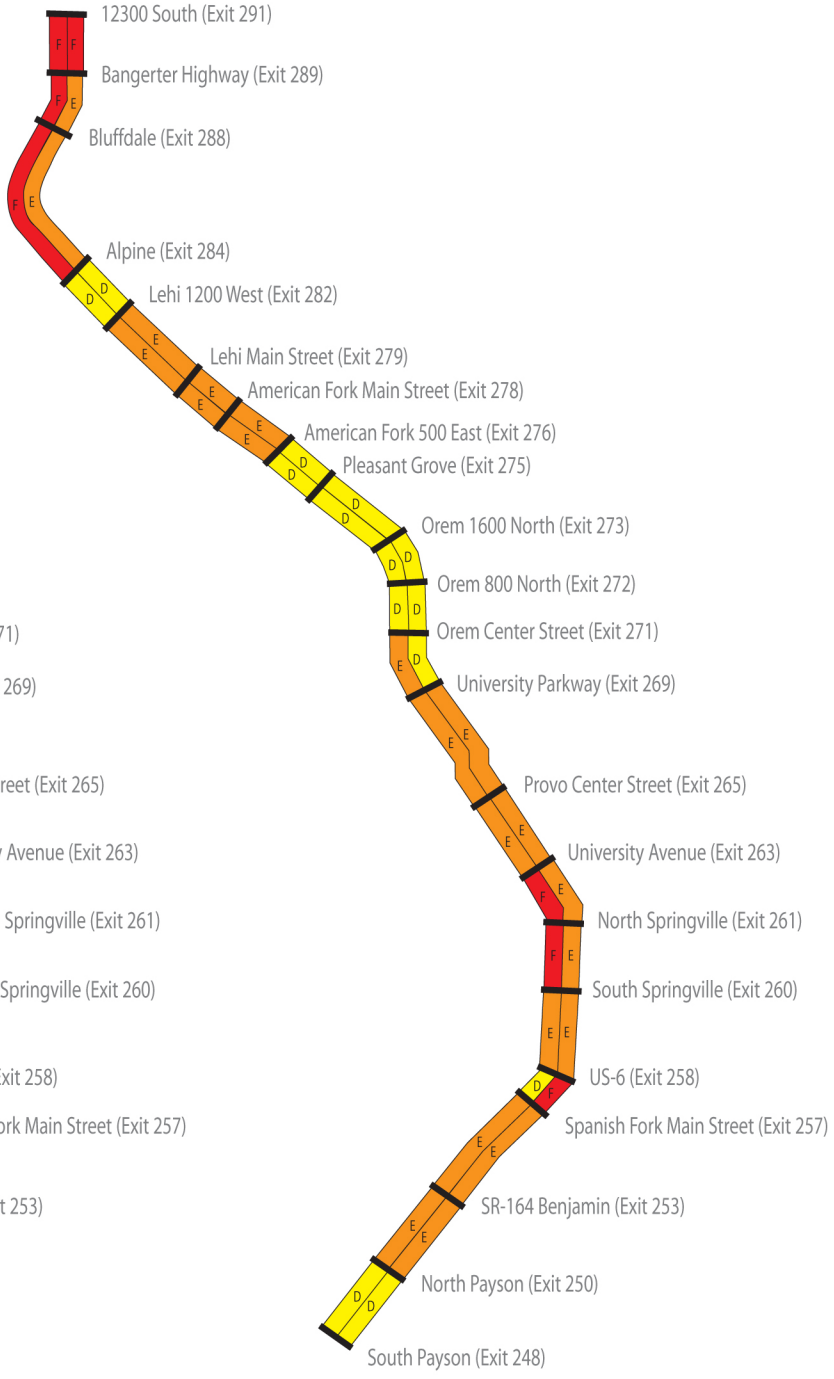


Figure 1-2

Mainline I-15 2005 Existing Level Of Service vs. 2030 No Build Level of Service

LEGEND

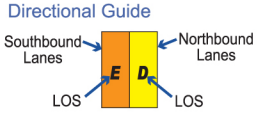
Salem

Interchange Names are shown for Southbound and Northbound I-15
(source: UDOT, Nov. 2004)

Level of Service for Peak Hour

A B C D E F

Directional Guide



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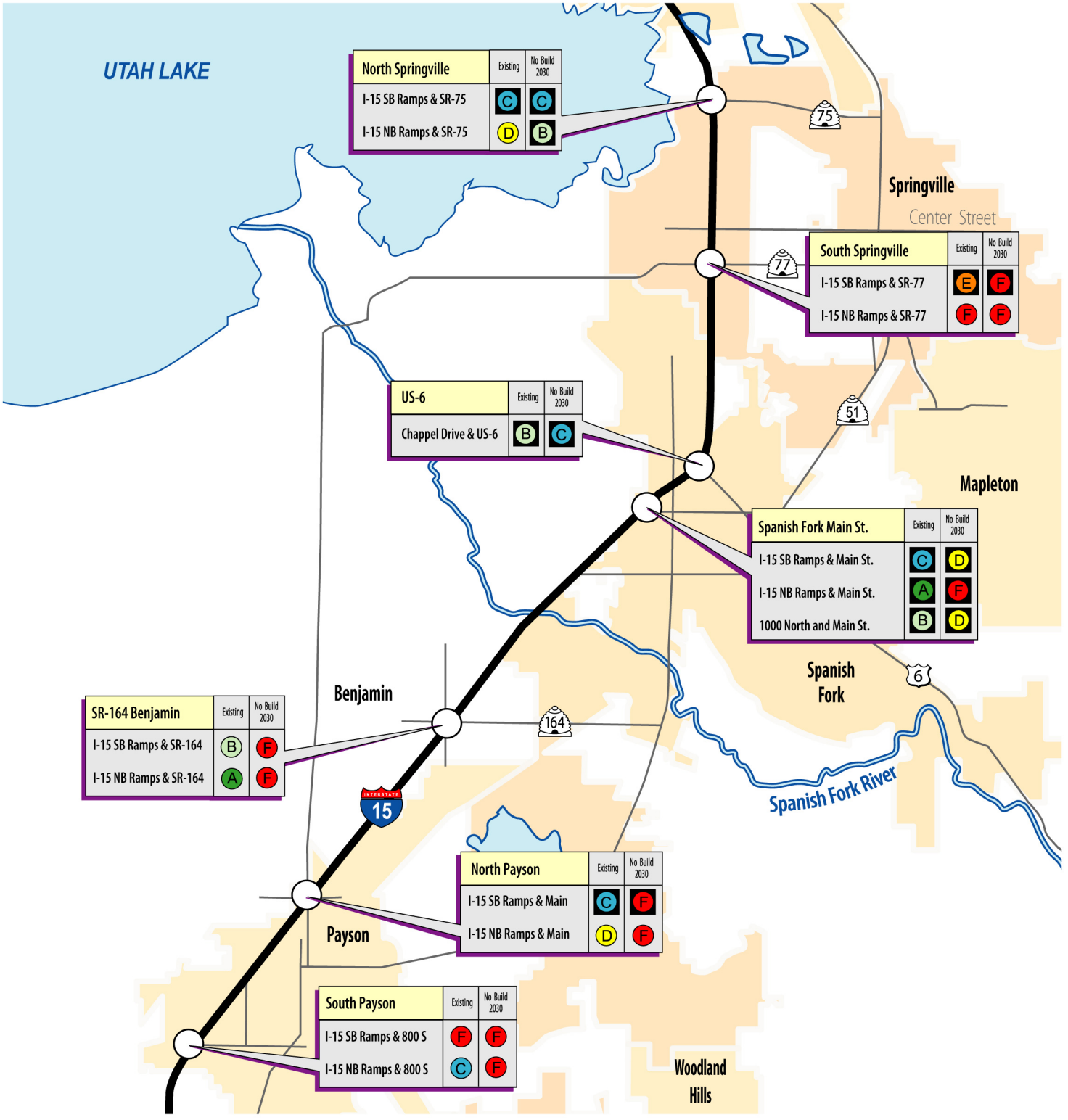


Figure 1-3

Intersection Level of Service PM Peak – Existing (2005) and 2030 No Build

LEGEND:

*Level of Service at **Unsignalized** Intersections:* A B C D E F

*Level of Service at **Signalized** Intersections:* A B C D E F

South Utah County Section

N

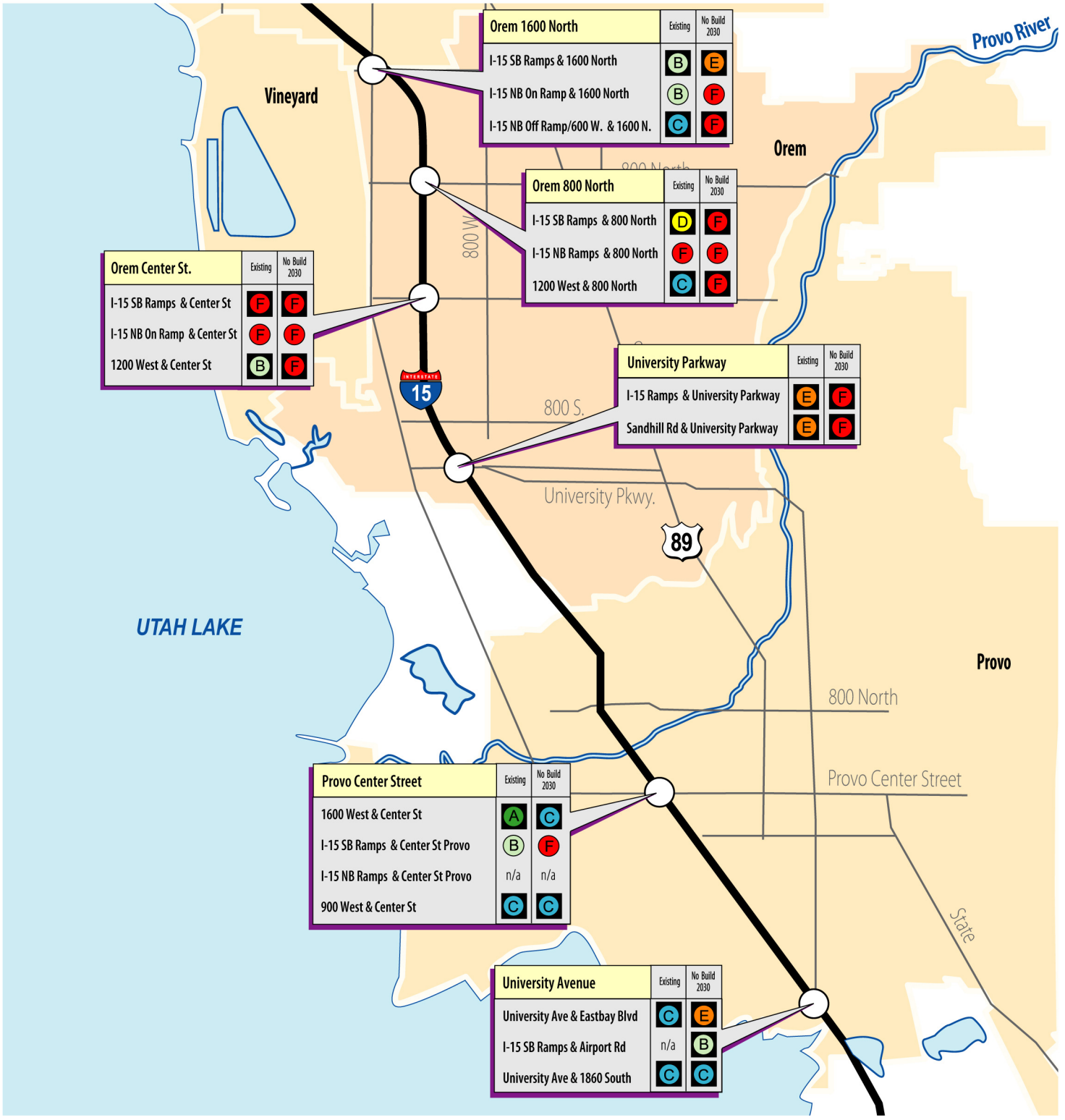


Figure 1-4

Intersection Level of Service PM Peak – Existing (2005) and 2030 No Build

LEGEND:

*Level of Service at **Unsignalized** Intersections:* A B C D E F

*Level of Service at **Signalized** Intersections:* A B C D E F

Central Utah County Section

N

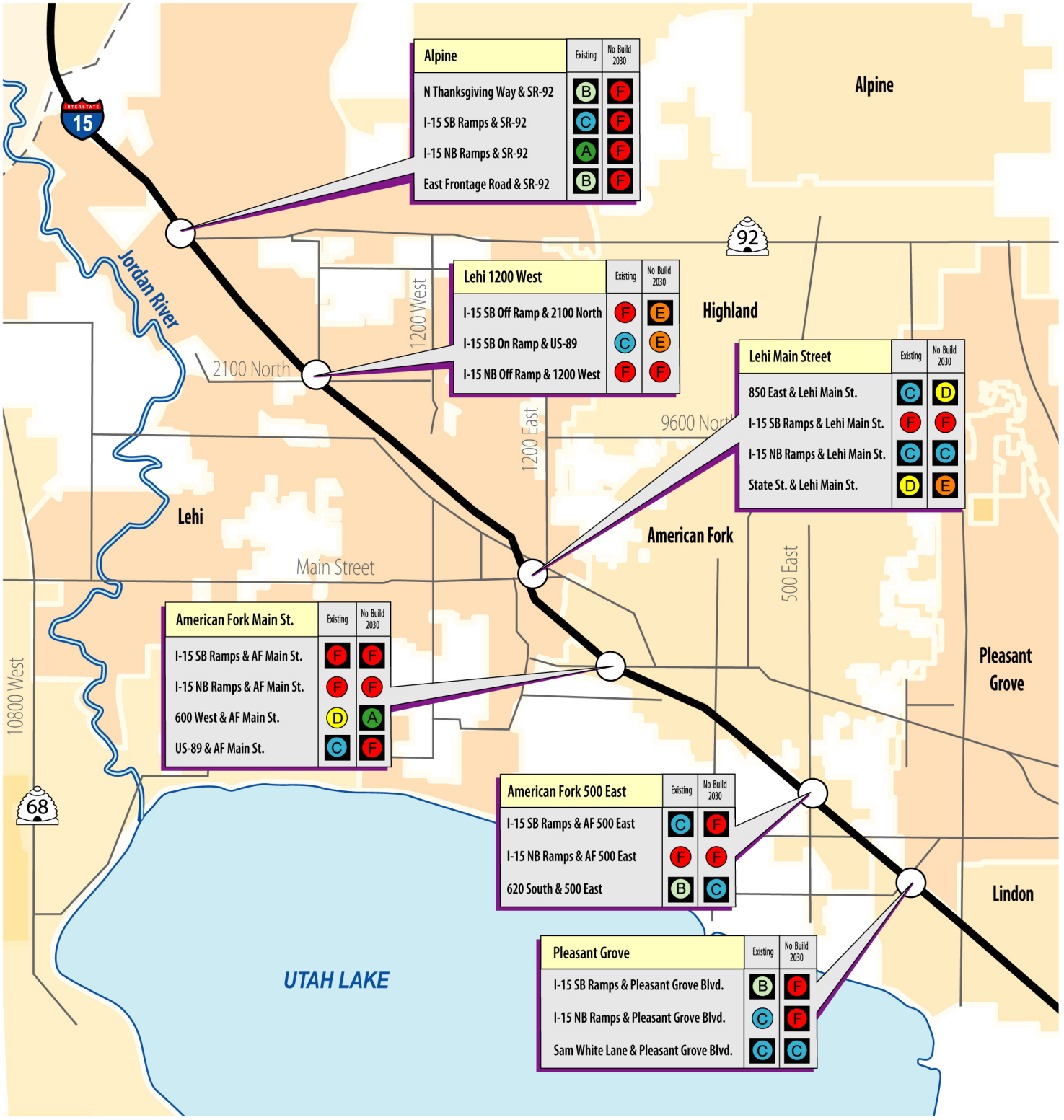


Figure 1-5

Intersection Level of Service PM Peak – Existing (2005) and 2030 No Build

LEGEND:

*Level of Service at **Unsignalized** Intersections:* A B C D E F

*Level of Service at **Signalized** Intersections:* A B C D E F

North Utah County Section

N

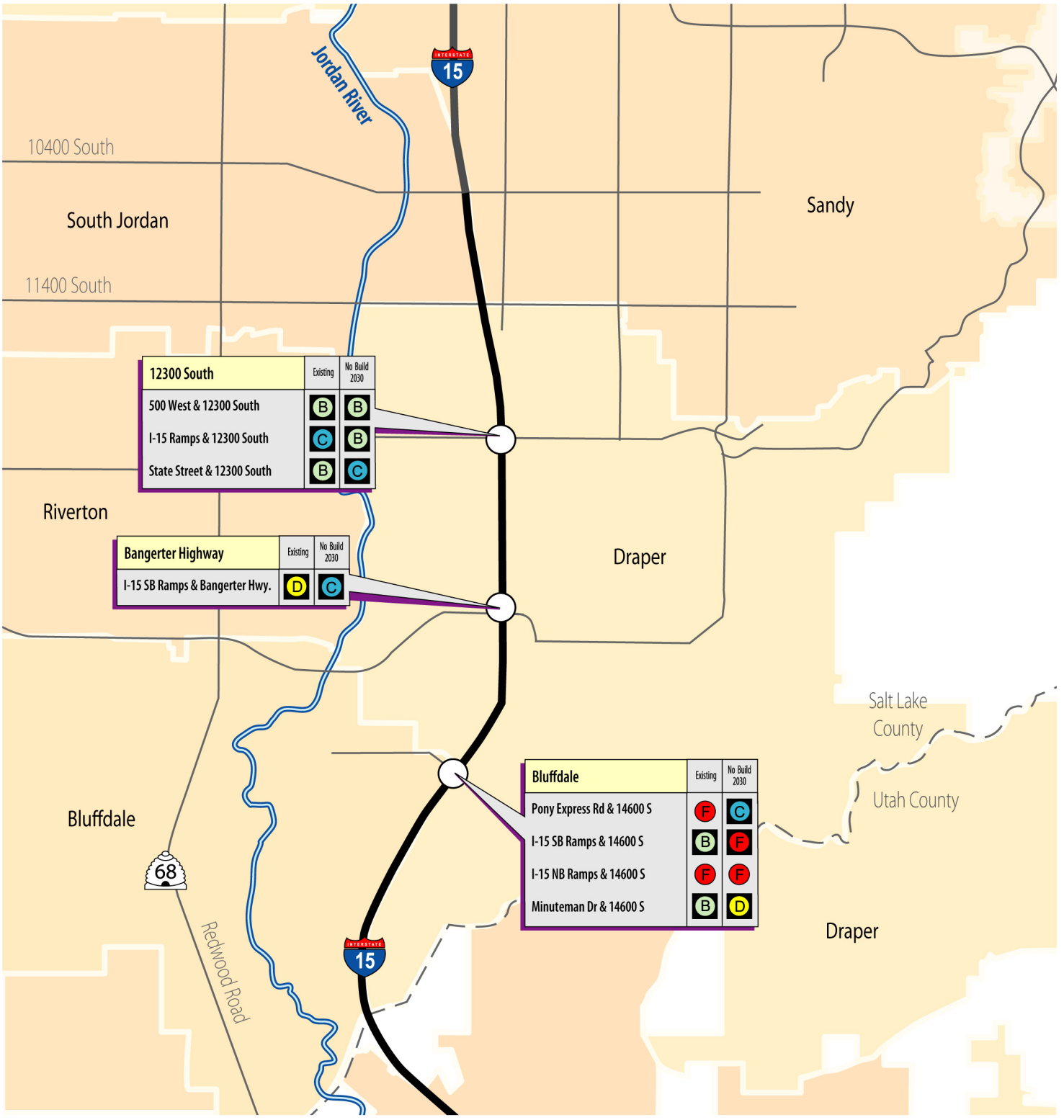


Figure 1-6

Intersection Level of Service PM Peak – Existing (2005) and 2030 No Build

LEGEND:

*Level of Service at **Unsignalized** Intersections:* A B C D E F

*Level of Service at **Signalized** Intersections:* A B C D E F

South Salt Lake County Section

N

1.5 Previous Studies and Regional Plans

The needs along the I-15 corridor have been documented in previous studies. This EIS is a direct outgrowth of prior transportation planning activities in the study area. The studies have demonstrated the need for a multi-modal transportation system that provides additional capacity and mobility options both regionally and within the cities and counties. Sections 1.5.1.1 through 1.5.1.3 summarize the previous planning efforts.

1.5.1 Previous Studies

1.5.1.1 Inter-Regional Corridor Alternatives Analysis (IRCAA) (January 2002)

This study, prepared by WFRC, developed a comprehensive plan for the best mix of transportation solutions to meet long-term (30-year) inter-regional mobility needs for I-15. The study indicated that demand on I-15 will exceed capacity by 2030 and demand for inter-regional transit services will also exceed supply. The plan recommended the following improvements:

- Commuter rail from Ogden to Provo;
- High occupancy vehicle[3] (HOV) lanes on I-15 from 10600 South to University Parkway in Provo;
- I-15 widening at the following locations: SR-134 (Weber County) to US-89 (Davis County), I-215 (North Salt Lake) to 600 North (Salt Lake), 10600 South to Payson Main Street;
- UTA's acquisition of right-of-way for potential commuter rail from Salt Lake City to Payson and a light rail extension from 10000 South in Sandy to Lindon.

1.5.1.2 Utah County I-15 Corridor Management Plan (August 2002)

This planning study, prepared by MAG, was initiated to further study I-15 improvements in Utah County identified in the IRCAA. This plan recommended the following:

- Widen I-15 to ten lanes, five in each direction (four general purpose lanes and one express lane) from the Salt Lake County line to the University Parkway interchange in Provo;
- Widen I-15 to eight lanes, four general purpose lanes each direction, from the University Parkway interchange to the US-6 interchange;
- Widen I-15 to six lanes, three general purpose lanes each direction, between the US-6 interchange and the North Payson interchange;
- Reconstruct existing interchanges between the Utah / Salt Lake County line and Payson to accommodate additional lanes;
- Construct new interchanges at the following locations: Lehi 300/500 West, Orem 800 South, Orem 2000 South, Provo 920 South, Spanish Fork 2700 North;
- Construct a new collector-distributor roadway between University Parkway in Orem and 920 South in Provo, if new interchanges were not built at Orem 2000 South and at Provo 920 South.

1.5.1.3 South Salt Lake County Transit Corridor Analysis (December 2000)

This feasibility study, completed by WFRC, considered the future expansion of the North-South TRAX light rail transit (LRT) line in south Salt Lake County. The study analyzed three proposed transit corridors in West Jordan, Draper City and Sandy City, two of which are in the I-15 corridor study area.

[3] High occupancy vehicle lanes are referred to as "express lanes" throughout this EIS. Express lanes can be used by multiple occupant vehicles (2 persons or more) and single occupancy vehicles paying a toll to use express lanes.

1.5.2 Regional Plans

1.5.2.1 Regional Planning

Pursuant to federal law, long-range regional transportation planning is a function assigned to the two metropolitan planning organizations (MPO) in Salt Lake and Utah counties. Wasatch Front Regional Council (WFRC) is the MPO in Salt Lake County and Mountainland Association of Governments (MAG) is the MPO in Utah County.

Both WFRC and MAG prepare financially-constrained regional transportation plans for Salt Lake and Utah counties, which are based upon projections of future travel demand. These plans include roadway and transit projects where funding is anticipated in the 2030 planning period. The MPO recommendations for improvements along the I-15 corridor are summarized below and document the need for additional capacity and increased transit options.

1.5.2.2 Utah Valley Regional Transportation Plan: 2007–2030 (MAG 2007)

This plan details existing and future transportation problems along I-15 that are the result of population growth. The plan identifies the following transportation improvements:

- Provide commuter rail service between Salt Lake and Utah counties parallel to I-15;
- Reconstruct I-15 mainline and interchanges, and add capacity to I-15 between the Utah/Salt Lake County line and Payson 800 South;
- Construct express lanes on I-15 from the Utah / Salt Lake County line to US-6;
- Add frontage roads in the Provo/Orem area; and
- Add new interchanges at North Lehi and Orem 800 South.

1.5.2.3 Wasatch Front Regional Transportation Plan: 2007–2030 (WFRC 2007)

This plan states that the growth in Salt Lake County has resulted in a need to improve north-south mobility between Salt Lake and Utah counties and along the I-15 corridor. Specific improvements relating to the I-15 roadway and transit networks include:

- Improve and widen I-15 from 10600 South to the Utah County Line;
- Construct a new interchange at 11400 South in Salt Lake County; and
- Provide transitways, high-frequency bus service, and expanded bus service in the study area.

1.6 Existing Transportation System

The transportation system that currently serves north/south travel in Utah County and Salt Lake County includes both I-15 and its associated interchanges, and UTA transit services. An overview of this system is contained in this section.

1.6.1 I-15 Mainline and Interchanges

The I-15 Corridor was divided into four geographic sections to facilitate presentation and evaluation in this EIS. These sections are:

- South Utah County Section (South Payson Interchange to University Avenue Interchange);
- Central Utah County Section (University Avenue Interchange to Pleasant Grove Interchange);
- North Utah County Section (Pleasant Grove Interchange to County Line); and
- South Salt Lake County Section (County Line to 12300 South Interchange).

The current lane configuration of I-15 is shown in Figure 1-7. There are 22 existing interchanges within the study area.

1.6.1.1 South Utah County Section

This section of the I-15 study area extends from approximately Exit 248 (Payson) to Milepost 262 (Springville) and includes seven existing interchanges (from south to north):

- South Payson – a diamond interchange at Payson 800 South (Exit 248);
- North Payson – a diamond interchange at Payson Main Street (Exit 250);
- SR-164 Benjamin – a diamond interchange (Exit 253);
- Spanish Fork Main Street – a diamond interchange (Exit 257);
- US-6 – a partial cloverleaf interchange (Exit 258);
- South Springville – a diamond interchange at SR-77 (Exit 260); and
- North Springville – a diamond interchange at SR-75 (Exit 261).

The I-15 mainline includes two lanes in each direction from the South Payson interchange to Spanish Fork Main Street interchange. A southbound auxiliary lane is included between the Spanish Fork Main Street interchange and the US-6 Interchange. I-15 includes three lanes in each direction between US-6 and the North Springville exit.

1.6.1.2 Central Utah County Section

The Central Utah County section of the I-15 study area extends from Milepost 262 (Springville) to Milepost 274 (Orem) and includes six existing interchanges:

- University Avenue – a partial cloverleaf interchange at SR-189 (Exit 263);
- Provo Center Street – a partial cloverleaf interchange (Exit 265);
- University Parkway – a Single Point Urban Interchange (SPUI) (Exit 269);
- Orem Center Street – a diamond interchange (Exit 271);
- Orem 800 North – a diamond interchange (Exit 272) and
- Orem 1600 North – a diamond interchange (Exit 273).

The I-15 mainline in this section consists of three lanes in each direction, with auxiliary lanes between the North Springville Interchange and the University Avenue Interchange; between the Orem 800 North Interchange and the Orem 1600 North Interchange; and between the Orem Center Street Interchange and the Orem 800 North Interchanges.

1.6.1.3 North Utah County Section

The North Utah County Section extends from approximately Milepost 274 (Orem) to Milepost 286 (Alpine) and includes six existing interchanges:

- Pleasant Grove – a diamond interchange (Exit 275);
- American Fork 500 East – a diamond interchange (Exit 276);
- American Fork Main Street – a diamond interchange (Exit 278);
- Lehi Main Street – a diamond interchange (Exit 279);
- Lehi 1200 West – a diamond interchange (Exit 282); and
- Alpine – a diamond interchange at SR-92 (Exit 284).

The I-15 mainline in this section consists of three general purpose lanes in each direction, an express lane in each direction, and a southbound auxiliary lane between Lehi Main Street and American Fork Main Street.

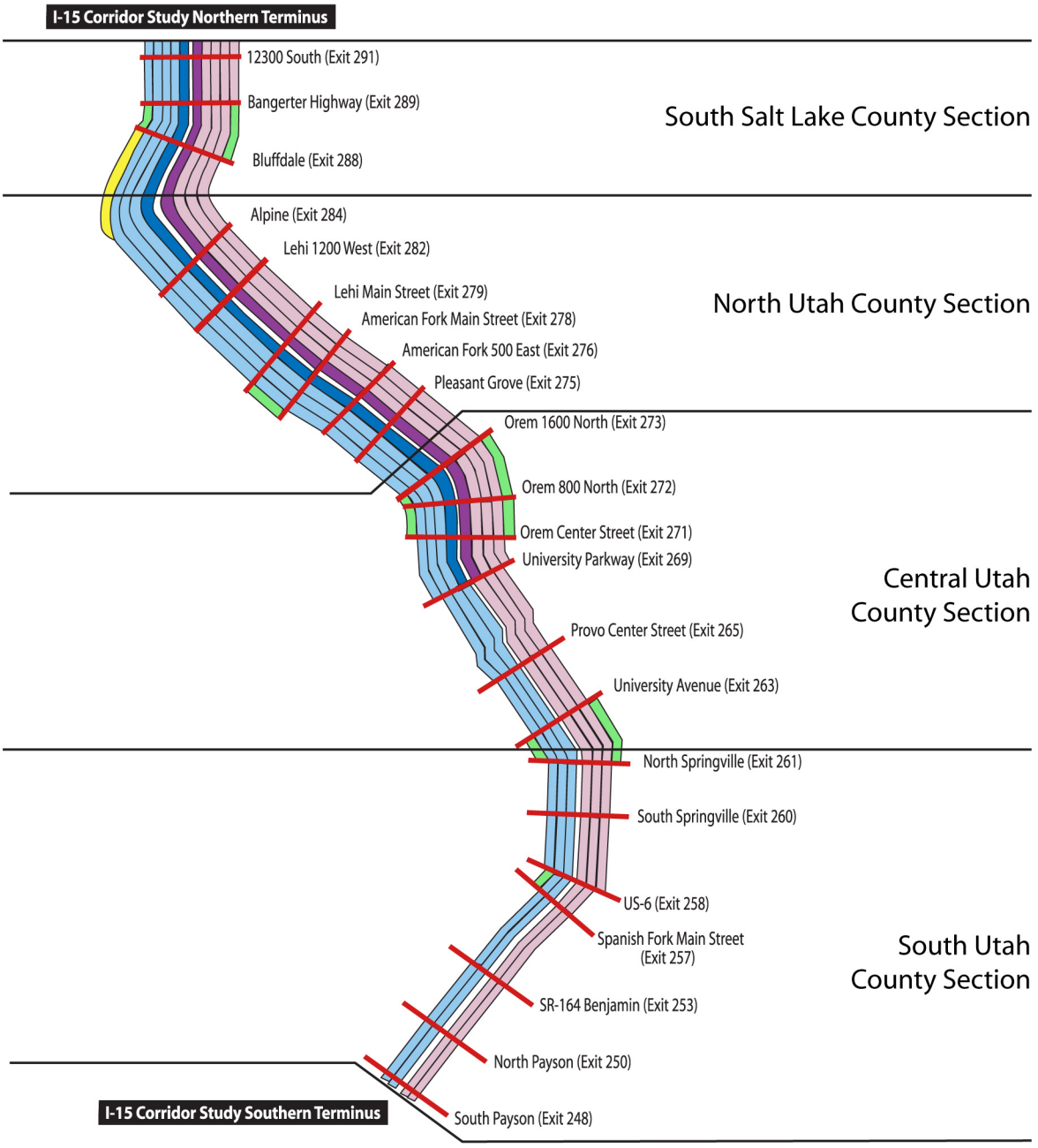


Figure 1-7

Existing I-15 Corridor Roadway Configuration/Number of Lanes

LEGEND

- Southbound General Purpose Lane
- Northbound General Purpose Lane
- Southbound Express Lane
- Northbound Express Lane
- Climbing Lane
- Auxilliary Lane

N

1.6.1.4 South Salt Lake County Section

The South Salt Lake County Section of the I-15 study area extends from approximately Milepost 286 (Alpine) to 12300 South and includes three existing interchanges:

- Bluffdale – a diamond interchange (Exit 288);
- Bangerter Highway –- a SPUI interchange (Exit 289); and
- 12300 South – a SPUI interchange (Exit 291).

The I-15 mainline includes three general purpose lanes and an express lane in each direction. There are both southbound and northbound auxiliary lanes between the Bangerter Highway Interchange and the Bluffdale Interchange. A southbound climbing lane begins south of the Bangerter Highway Interchange and ends at approximately the county line.

1.6.2 Existing Transit Facilities and Service

I-15 is the major corridor used by the UTA to serve Utah and Salt Lake counties with inter-regional bus service. Transit service and carpooling in the I-15 corridor are served by park and ride lots throughout Utah and Salt Lake counties adjacent to the corridor. Within the project corridor, UTA operates seven peak-period regional express routes using I-15, and seven local feeder routes. The express bus routes provide service to downtown Salt Lake City, the University of Utah, and the Sandy TRAX station. There is one all-day regional express route that consists of express bus service to the Sandy TRAX station. All-day light rail transit (LRT) service is available to downtown Salt Lake City and the University of Utah from the Sandy station.

Based on July 2004 ridership data, the three UTA bus routes with the highest passengers per trip values are all within the I-15 study corridor. The passengers per trip average for the regional express routes within the corridor is more than double the system-wide per trip average.

Buses are the primary mode of public transportation in the I-15 corridor. UTA operates express bus service to Salt Lake City from Spanish Fork and points further north in Utah County. Where express lanes are not provided, those buses use the same lanes as general purpose traffic and experience the same traffic congestion on I-15 as passenger vehicles. Nonetheless, these express routes are well-used, carrying more than twice the number of passengers per trip compared to the UTA system average, with several of the routes operating buses at capacity. Table 1-1 summarizes the express bus route capacity and passenger usage. There are currently 9 park-and-ride lots within the I-15 corridor: 7 in Utah County, and 2 in Salt Lake County.

Table 1-1: Corridor Express Bus Route Passenger Usage

Express Route	Daily Passengers	Daily Trips	Passengers Per Trip	Average Percent of Bus Capacity Used Per Trip
347 – Riverton Express	107	4	26.8	47%
801 – Salt Lake City/Orem/Provo Express	278	6	46.3	81%
802 – Salt Lake City/Utah County Express	369	8	46.1	81%
803 – Salt Lake City/Spanish Fork Express	153	4	38.3	67%
804 – Salt Lake City/Lindon Express	225	4	56.3	99%
810 – University of Utah/American Fork Express	138	4	34.5	61%

1.7 Historic Growth Rates

Historic population and vehicle travel trends show a steady increase in traffic volume. Vehicle Miles Traveled (VMT) is the measure of the total distance traveled within an area and is a good indicator of traffic growth because it reflects both volume and distance traveled. VMT on I-15, in the study area, has increased primarily due to the population and employment growth in both Utah and Salt Lake counties along with an increase in average trip length. As shown on Figure 1-8, this value has been increasing faster than population growth in Utah County and is typical of travel demand trends observed in Salt Lake County, statewide, and throughout the United States.

Increased traffic growth is easily observed on I-15 in Utah County, where traffic volumes have more than tripled over the past 20 years (see Figure 1-8). The trend is expected to continue with Average Annual Daily Traffic (AADT) volumes on I-15 projected to at least double over the next 25 years by 2030.

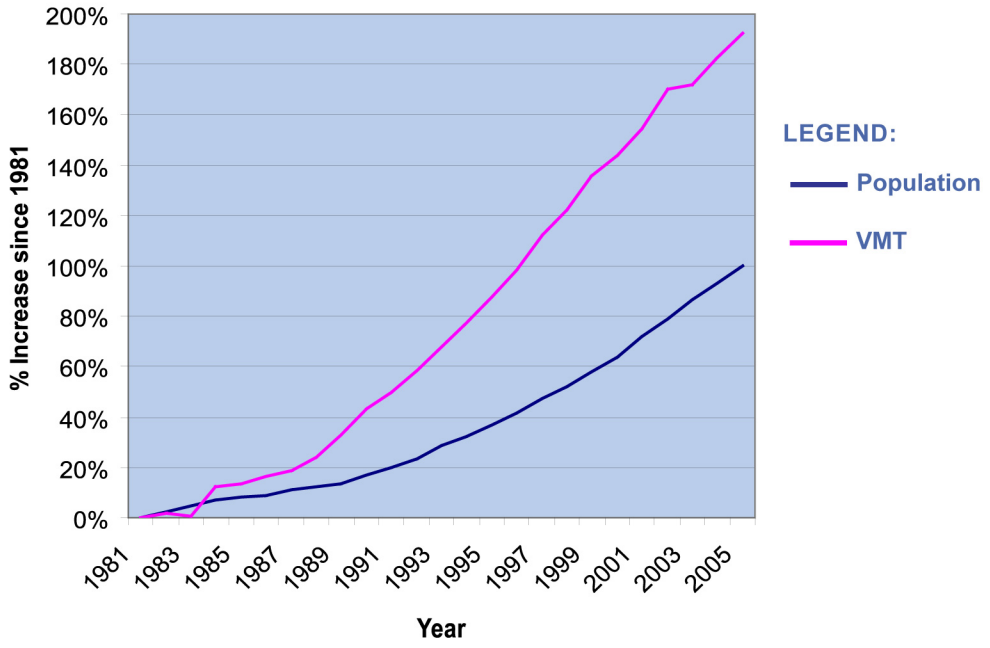
1.8 Existing Traffic Conditions

As described below (Section 1.8.2), existing traffic conditions on I-15 were analyzed for both the I-15 mainline traffic and interchange components.

The method that is used to evaluate traffic operations throughout the United States is one established by the Transportation Research Board. The Board has established Level-of-Service (LOS) as the transportation engineering standard used to measure how highways, interchanges, and intersections function based on traffic volumes and roadway geometry. It allows decision makers and the public to compare performance of transportation alternatives. Although LOS is quantitative it is also a qualitative measure that examines how the transportation system operates and how drivers perceive these conditions. It is related to the physical characteristics of the highway and the operating characteristics that can occur when the highway supports different traffic volumes. It generally describes these characteristics in terms of such factors as speed, delay at intersections, freedom to maneuver, traffic interruptions, driver comfort and convenience, and safety.

Level-of-Service is rated A through F. LOS as applied to roadway segments (e.g. freeway or highway) is described in Table 1-2, with LOS A representing the least congestion and LOS F representing the most congestion.

Population vs. Vehicle Miles Traveled (VMT) in Utah County



Historic I-15 Daily Volumes

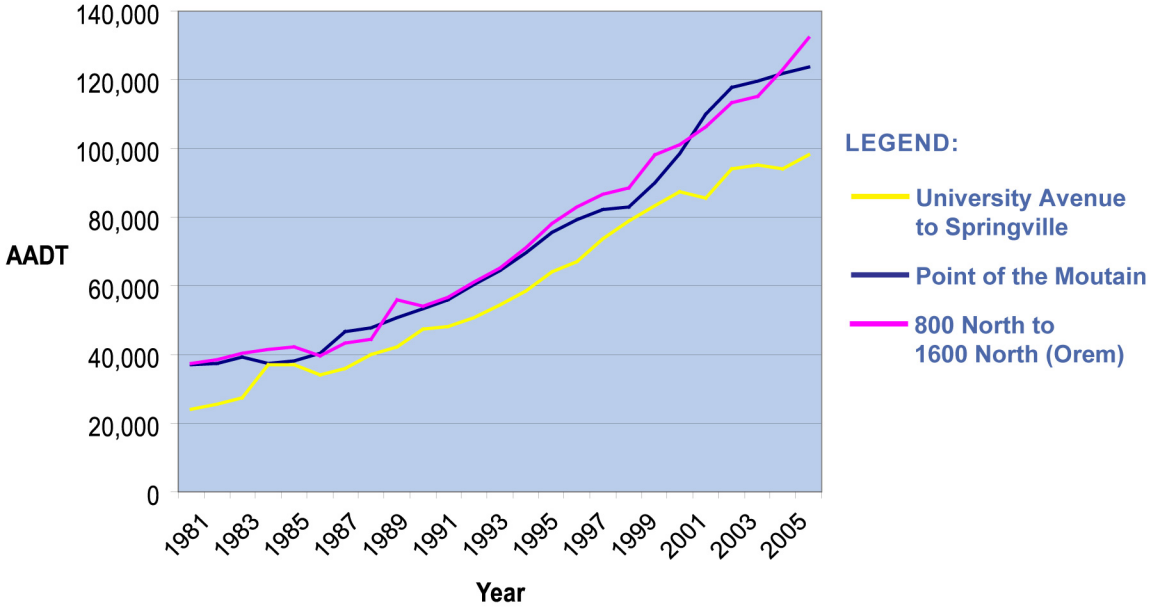


Figure 1-8

Existing & Historical Population vs. Vehicle Miles Traveled and Traffic Volumes for Utah County

Table 1-2: Level-of-Service Definitions

Definitions of Level Of Service (LOS)

v/c ratio (LOS)	Roadway Segment Operating Characteristics	Visual Example
A	Represents free traffic flow, very few cars on roadway.	
B	In the range of free traffic flow, with some other motorists in the traffic stream begins to be noticeable. Some time spent following slower vehicles but appropriate gaps in traffic allows for passing with little delay.	
C	In the beginning range of traffic flow in which the operation of individual motorists becomes significantly affected by other motorists in the traffic stream. Time spent following slower vehicles is longer and occurs more frequently, but appropriate gaps in traffic allows for passing with moderate delay.	
D	Represents high-density traffic flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Time spent following slower vehicles is noticeably longer and occurs more frequently, and there are fewer gaps in traffic to allow for passing, increasing overall delay.	
E	Represents operating conditions at or above the capacity level. All speeds are reduced to a low and relatively uniform speed. Time spent following slower vehicles exceeds time not behind slower vehicles, and there are few if any gaps in traffic to allow for passing.	
F	Used to define intermittent stopping and moving at a very reduced speed. This condition exists wherever the amount of traffic exceeds the capacity of that point. Time spent following slower vehicles approaches 100 percent of the time traveling on a roadway segment, and there are likely no gaps in traffic to allow for passing.	

Source: Transportation Research Board, Highway Capacity Manual / (HCM) 2000, Pg. 10-5.

Generally, LOS E and F are considered unacceptable conditions and an indication that improvements are warranted. The American Association of State Highway and Transportation Officials (AASHTO) policy states, "As may be fitting to the conditions, highway agencies should strive to provide the highest level of service practical. For example, in heavily developed sections of metropolitan areas, conditions may make the use of Level-of-Service D appropriate for freeways and arterials; however, this level should be used sparingly and Level-of-Service C should be sought."[4] A secondary purpose of this project is to achieve LOS D on I-15 and at interchanges and their components during the peak hour.

1.8.1 Existing Conditions Traffic Data Collection

Traffic volume information was collected and analyzed (as described in Section 1.8.2) to help determine current usage of I-15 during the PM peak hour and how the amount of traffic changes during the day. The PM peak hour is the single hour in the evening with the highest volumes. Peak hour data is a key input to Level-of-Service analysis.

[4] AASHTO's *A Policy on Geometric Design of Highways and Streets, 2004*

Existing I-15 mainline (general purpose and express lanes) and ramp volumes for I-15 were derived from multiple sources. Evening traffic counts were conducted at seventeen interchanges in 2005. Counts were conducted between Tuesday and Thursday from 4:00 to 6:00 PM during clear weather conditions. In 2007, additional counts were conducted in the Lehi Main Street interchange area. Additional PM traffic data was obtained from cities along the corridor. Data from UDOT's Automatic Traffic Recorder permanent count station #306, just south of Provo Center Street was also used. The traffic count data was then analyzed for consistency, and balanced to formulate the final traffic estimates used for PM peak hour analysis.

Figure 1-9 shows the daily variation in traffic volume on an October weekday between University Parkway (Exit 269) and Provo Center Street (Exit 265). Two peaks are noticeable: one in the morning and one in the late afternoon/early evening, corresponding with the daily commute periods. The evening peak period generally experiences heavier traffic flows than the morning.

1.8.2 Existing Traffic Volumes

Peak hour vehicle volumes are used to assess the effectiveness of traffic flow. The morning peak hour between 7 and 8 AM and the evening peak hour between 5 and 6 PM are typically used to evaluate traffic volume. Table 1-3 shows the daily traffic in both directions, and peak hour traffic volumes that note the highest peak hour traffic levels and in which time of day and direction they occur. The daily volumes were taken from the 2005 Traffic on Utah Highways, published by UDOT. The PM peak hour volumes were developed using 2005 data from the Automatic Traffic Recorder on I-15 between Provo Center Street and University Parkway and interchange ramp volumes obtained from intersection turning movement data throughout the corridor. The AM peak hour volumes were developed using AM-to-PM ratios obtained from the WFRC/MAG travel model and applying those ratios to the PM volumes.

Average daily traffic volumes are highest in the northern portion of the corridor between 12300 South and Alpine and between Pleasant Grove and University Parkway. In the southbound direction, traffic volumes are highest during the PM peak hour. In the northbound direction, traffic volumes are highest during the AM peak hour with the exception of the segments between Lehi 1200 West and Provo Center Street, which experience their highest volumes during the PM peak hour.